

Labino AB

Fågelsångsvägen 16

186 42 Vallentuna

## Classification of light source in accordance with IEC / SS-EN 62471<sup>(1 appendix)</sup>

RISE Research Institutes of Sweden has performed classification of a light source in accordance with SS-EN 62471:2008.

### Test object

MB 3.0 Selene/Atlas

### Classification

The light source tested belongs to *Risk Group 3 (High Risk)* when using the UV light and *Risk Group 1 (Low Risk)* when using the white light.

### Identification

Reference: Lisel Athanasiadis

Date of arrival: December 2020

Manufacturer: Labino AB

Type: MB 3.0 Selene/Atlas, s/n: M3SM05

### Date of measurement

January 11-28, 2021.

### Test conditions

Measurements were carried out in a temperature-stabilized laboratory with the temperature  $23\text{ °C} \pm 2\text{ °C}$ .

Measurements of radiance/irradiance were made at a distance of 200 mm from the lamp front surface, which is considered appropriate for the application at hand. Measurements were made in the wavelength range 250 nm to 800 nm. No significant radiation was detected outside this range.

### Instruments

Spectroradiometer Optronic 756 inv.no. 901723

Picoammeter Keithley 6485/E inv.no. 603159

Silicon detector inv.no. 500963

### Test method

Applicable parts of SS-EN 62471:2008 and RISE Method 4432.

### RISE Research Institutes of Sweden AB

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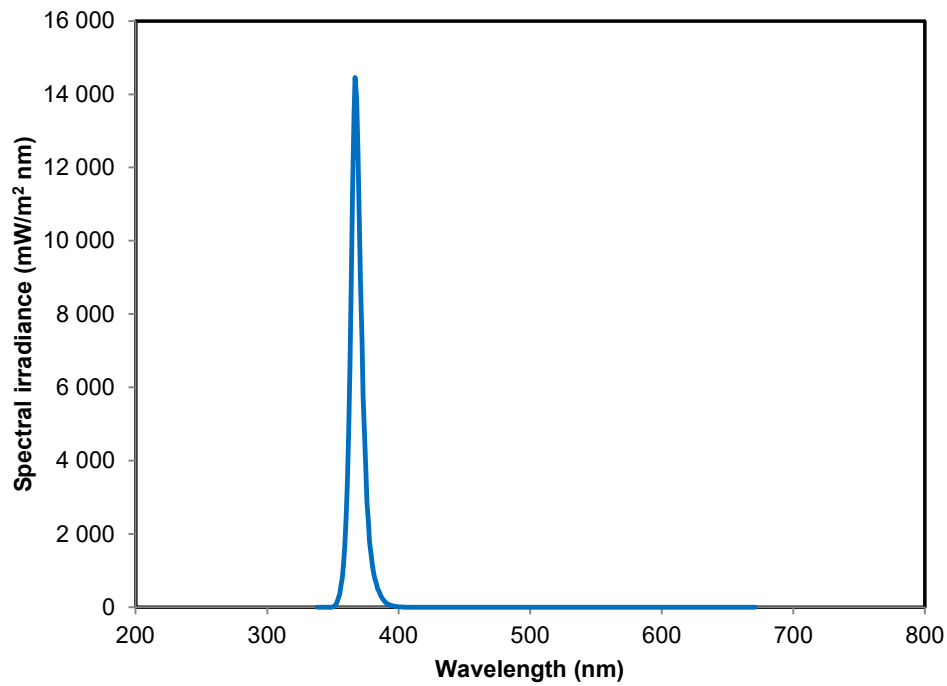
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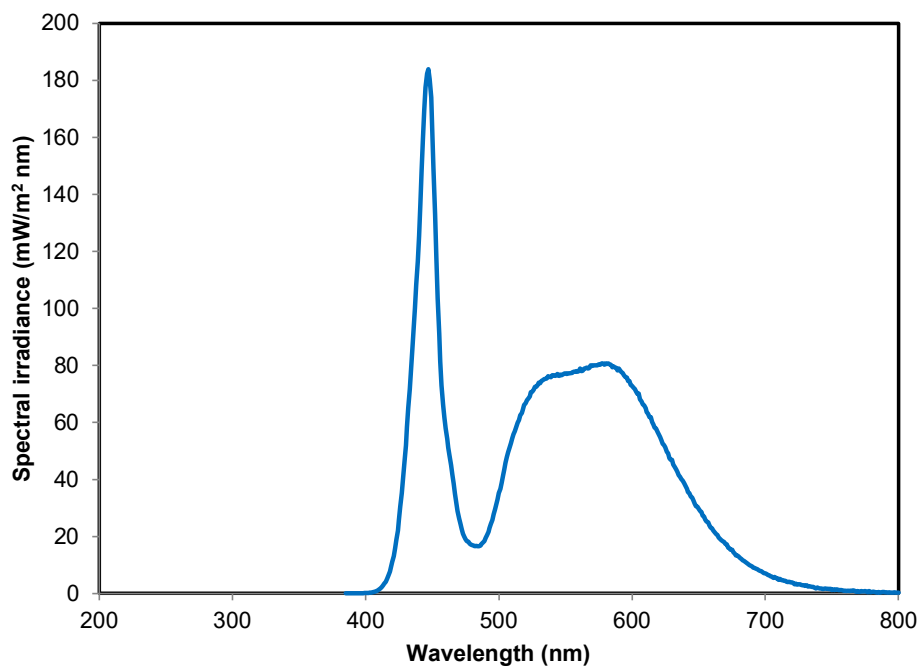
**Test result light source MB 3.0 Selene/Atlas**

The spectral content for the UV light source is shown in figure 1 below. No significant radiation was detected outside the shown range.



*Figure 1. Spectral irradiance.*

The spectral content for the White light source is shown in figure 2 below. No significant radiation was detected outside the shown range.



*Figure 2. Spectral irradiance.*

**Table 1.** Summary of results for the UV lamp based on irradiance measurement.

Hazard name	Wavelength range (nm)	Exposure duration (s)	Limiting aperture (rad)	Exposure limit Risk Group 2 (W/m <sup>2</sup> )	Measurement value (W/m <sup>2</sup> )
Actinic UV skin & eye $E_s$	200 - 400	1000	1.4	$3.0 \times 10^{-2}$	$2.4 \times 10^{-2}$
Eye UV-A $E_{UVA}$	315 - 400	100	1.4	100,0	238,7
Blue-light small source $E_B$	300 - 700	0,25	<0.011	N/A	N/A
Eye IR $E_{IR}$	780 - 3000	10	1.4	N/A	N/A
Skin thermal $E_H$	380 - 3000	10	$2 \pi$ sr	3557	11

**Table 2.** Summary of results for the UV lamp based on radiance measurement.

Hazard name	Wavelength range (nm)	Exposure duration (s)	Limiting aperture (rad)	Exposure limit Risk Group 1 (W/m <sup>2</sup> )	Measurement value (W/m <sup>2</sup> sr)
Blue light $L_B$	300 - 700	10000	0.011	$1.0 \times 10^4$	$1.4 \times 10^3$
Retinal thermal $L_R$	380 - 1400	10	0.011	$(\alpha = 0.1)$ $2.8 \times 10^5$	$3.4 \times 10^3$
Retinal thermal (weak visual stimulus) $L_{IR}$	780 - 1400	N/A	0.011	N/A	N/A

Results based on the irradiance and radiance measurement show that the UV light source should be classified as belonging to *Risk group 3*.

**Table 3.** Summary of results for the White lamp based on irradiance measurement.

Hazard name	Wavelength range (nm)	Exposure duration (s)	Limiting aperture (rad)	Exposure limit exempt Group (W/m <sup>2</sup> )	Measurement value (W/m <sup>2</sup> )
Actinic UV skin & eye $E_s$	200 - 400	1000	1.4	N/A	N/A
Eye UV-A $E_{UVA}$	315 - 400	100	1.4	N/A	N/A
Blue-light small source $E_B$	300 - 700	0,25	<0.011	N/A	N/A
Eye IR $E_{IR}$	780 - 3000	10	1.4	N/A	N/A
Skin thermal $E_H$	380 - 3000	10	$2 \pi$ sr	3557	13

**Table 4.** Summary of results for the White lamp based on radiance measurement.

Hazard name	Wavelength range (nm)	Exposure duration (s)	Limiting aperture (rad)	Exposure limit Risk Group 1 (W/m <sup>2</sup> )	Measurement value (W/m <sup>2</sup> sr)
Blue light $L_B$	300 - 700	10000	0.011	$1.0 \times 10^4$	$7.7 \times 10^3$
Retinal thermal $L_R$	380 - 1400	10	0.011	( $\alpha = 0.03$ ) $9.4 \times 10^5$	$9.5 \times 10^4$
Retinal thermal (weak visual stimulus) $L_{IR}$	780 - 1400	N/A	0.011	N/A	N/A

Results based on the irradiance and radiance measurement show that the White light source should be classified as belonging to *Risk group 1*.

### Measurement uncertainty

Radiance/Irradiance:  $\pm 10$  %

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k = 2$ , which for a normal distribution corresponds to a coverage probability of approximately 95 %. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/02.

### Remark

The results in this report are only valid for the item tested. The classification has been done without considering the measurement uncertainties.

**RISE Research Institutes of Sweden AB**  
**Measurement Science and Technology - Time and Optics**

Performed by

Examined by

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**Appendix**

## Appendix 1

### Photo of the test object



Labino AB

Fågelsångsvägen 16

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## Classification of light source in accordance with IEC / SS-EN 62471<sup>(1 appendix)</sup>

RISE Research Institutes of Sweden has performed classification of a light source in accordance with SS-EN 62471:2008.

### Test object

MB 3.0 Zeus/Hermes

### Classification

The light source tested belongs to *Risk Group 3 (High Risk)* when using the UV light and *Risk Group 1 (Low Risk)* when using the white light.

### Identification

Reference: Lisel Athanasiadis

Date of arrival: December 2020

Manufacturer: Labino AB

Type: MB 3.0 Zeus/Hermes, s/n: M3ZM04

### Date of measurement

January 11-28, 2021.

### Test conditions

Measurements were carried out in a temperature-stabilized laboratory with the temperature  $23\text{ °C} \pm 2\text{ °C}$ .

Measurements of radiance/irradiance were made at a distance of 200 mm from the lamp front surface, which is considered appropriate for the application at hand. Measurements were made in the wavelength range 250 nm to 800 nm. No significant radiation was detected outside this range.

### Instruments

Spectroradiometer Optronic 756 inv.no. 901723

Picoammeter Keithley 6485/E inv.no. 603159

Silicon detector inv.no. 500963

### Test method

Applicable parts of SS-EN 62471:2008 and RISE Method 4432.

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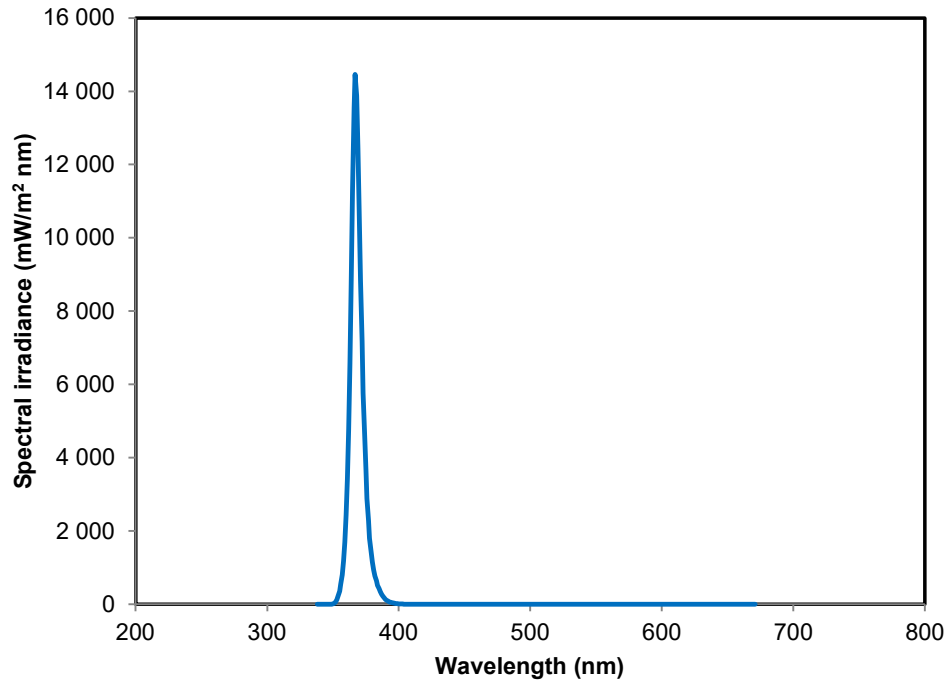
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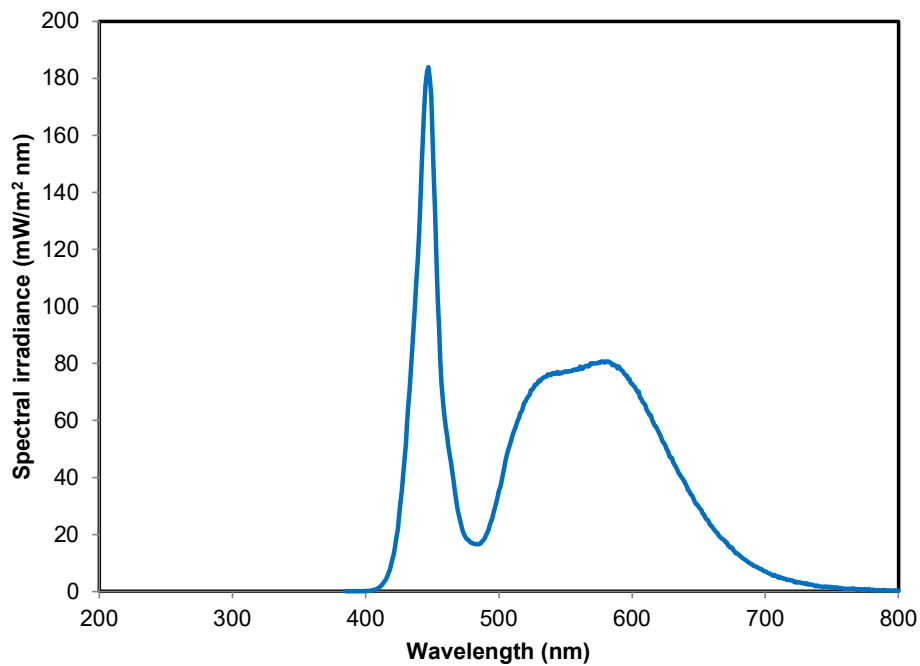
**Test result light source MB 3.0 Zeus/Hermes**

The spectral content for the UV light source is shown in figure 1 below. No significant radiation was detected outside the shown range.



*Figure 1. Spectral irradiance.*

The spectral content for the White light source is shown in figure 2 below. No significant radiation was detected outside the shown range.



*Figure 2. Spectral irradiance.*



**Table 1.** Summary of results for the UV lamp based on irradiance measurement.

Hazard name	Wavelength range (nm)	Exposure duration (s)	Limiting aperture (rad)	Exposure limit Risk Group 2 (W/m <sup>2</sup> )	Measurement value (W/m <sup>2</sup> )
Actinic UV skin & eye $E_s$	200 - 400	1000	1.4	$3.0 \times 10^{-2}$	$1.5 \times 10^{-2}$
Eye UV-A $E_{UVA}$	315 - 400	100	1.4	100,0	151,9
Blue-light small source $E_B$	300 - 700	0,25	<0.011	N/A	N/A
Eye IR $E_{IR}$	780 - 3000	10	1.4	N/A	N/A
Skin thermal $E_H$	380 - 3000	10	$2 \pi$ sr	3557	7

**Table 2.** Summary of results for the UV lamp based on radiance measurement.

Hazard name	Wavelength range (nm)	Exposure duration (s)	Limiting aperture (rad)	Exposure limit Risk Group 1 (W/m <sup>2</sup> )	Measurement value (W/m <sup>2</sup> sr)
Blue light $L_B$	300 - 700	10000	0.011	$1.0 \times 10^4$	$3.4 \times 10^2$
Retinal thermal $L_R$	380 - 1400	10	0.011	$(\alpha = 0.1)$ $2.8 \times 10^5$	$8.0 \times 10^2$
Retinal thermal (weak visual stimulus) $L_{IR}$	780 - 1400	N/A	0.011	N/A	N/A

Results based on the irradiance and radiance measurement show that the UV light source should be classified as belonging to *Risk group 3*.

**Table 3.** Summary of results for the White lamp based on irradiance measurement.

Hazard name	Wavelength range (nm)	Exposure duration (s)	Limiting aperture (rad)	Exposure limit exempt Group (W/m <sup>2</sup> )	Measurement value (W/m <sup>2</sup> )
Actinic UV skin & eye $E_s$	200 - 400	1000	1.4	N/A	N/A
Eye UV-A $E_{UVA}$	315 - 400	100	1.4	N/A	N/A
Blue-light small source $E_B$	300 - 700	0,25	<0.011	N/A	N/A
Eye IR $E_{IR}$	780 - 3000	10	1.4	N/A	N/A
Skin thermal $E_H$	380 - 3000	10	$2 \pi$ sr	3557	16

**Table 4.** Summary of results for the White lamp based on radiance measurement.

Hazard name	Wavelength range (nm)	Exposure duration (s)	Limiting aperture (rad)	Exposure limit Risk Group 1 (W/m <sup>2</sup> )	Measurement value (W/m <sup>2</sup> sr)
Blue light $L_B$	300 - 700	10000	0.011	$1.0 \times 10^4$	$7.6 \times 10^3$
Retinal thermal $L_R$	380 - 1400	10	0.011	( $\alpha = 0.03$ ) $9.4 \times 10^5$	$9.2 \times 10^4$
Retinal thermal (weak visual stimulus) $L_{IR}$	780 - 1400	N/A	0.011	N/A	N/A

Results based on the irradiance and radiance measurement show that the White light source should be classified as belonging to *Risk group 1*.

### Measurement uncertainty

Radiance/Irradiance:  $\pm 10$  %

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k = 2$ , which for a normal distribution corresponds to a coverage probability of approximately 95 %. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/02.

### Remark

The results in this report are only valid for the item tested. The classification has been done without considering the measurement uncertainties.

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**Measurement Science and Technology - Time and Optics**

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**Appendix**

## Appendix 1

## Photo of the test object

